

the area the snowfall was below the normal. However, owing to the earlier snows, the average flow of irrigation water is expected.

#### RIVERS.

River stages in Oklahoma continued below the normal, except that there was a rapid rise in the Grand and Neosho Rivers on the 25th and 26th, due to heavy local rains. In Kansas the rivers continued low with but slight changes during the month. No high stages occurred in the Arkansas River during the month, but there was sufficient water for navigation.

Heavy rains in the Black and White River Valleys, Ark., March 21 to 26 caused moderate floods in the Black River and in the lower reaches of the White River. So far as known no damage resulted from these floods. No flood occurred in the Red River, but there was a sharp rise in the lower reaches of this stream about the middle of the month. Several sharp rises occurred during the month in the upper Ouachita, but the lower Ouachita remained nearly stationary.

The Mississippi River was rising at the close of the month at all stations below St. Louis as a result of the unprecedented flood coming out of the Ohio drainage basin. The stages in feet, on March 31, were as follows: Memphis, 36; Helena, 41.5; Arkansas City, 42; Vicksburg, 39.6; Natchez, 39.2; Baton Rouge, 29.2; Donaldsonville, 22.7; and New Orleans, 14.5.

#### SEVERE LOCAL STORMS, LOUISIANA.

By ISAAC M. CLINE, District Forecaster.

Local storms of unusual severity occurred in Sabine, Natchitoches, Grant, and Winn Parishes during the forenoon of March 13, 1913. The storm occurred about 9.40 a. m. near Florence, Sabine Parish; about 10 a. m. at Provencal, Natchitoches Parish; and about 10.30 a. m. in Winfield Parish. Four persons were killed near Florence and one at Provencal, and 46 persons were reported injured. At Provencal the property damage was about \$50,000; but in other sections the damage was scattered and not heavy. The path of greatest destruction ranged from 300 feet to half a mile in width.

#### TORNADOES IN ARKANSAS, MARCH, 1913.

By H. F. ALCIATORE, Section Director.

Tornadoes occurred in parts of Union County on March 13 between 9 and 10 a. m. About 48 persons were injured, one of whom, a woman, died shortly after the storm from the result of her injuries. The greatest damage was done by the storms in the vicinity of Caledonia, Hibank, and Blanchard Springs, the loss in stores, farmhouses, etc., being estimated at \$24,000. It is interesting to note that the pendent, funnel-shaped cloud, typical of tornadic disturbances, was observed in every case. The width of the path of greatest destruction varied from 100 yards at Caledonia to one-half mile at Blanchard Springs.

On March 20, between 9.30 and 10.30 p. m., tornadoes of great violence occurred at Hoxie, Gillett, Eudora, Brinkley, Walnut Ridge, Star City, McArthur, Nettleton, Newport, Wynne, Pine Bluff, and in the vicinity of McGehee, Jonesboro, and Paragould. One person was killed in the Eudora storm. Three persons were injured at Hoxie, 2 at Walnut Ridge, 2 in the vicinity of Jonesboro, and 3 near Paragould. The greater portion of the business districts were destroyed at Hoxie and Walnut Ridge, the total loss at those two places alone being

estimated at \$87,000. The losses at the other places named ranges from \$500 to \$4,000.

On March 24, about midnight, tornadoes did considerable damage at Harmony, Rumley, Powers, and the vicinity of Leslie. Three persons were killed and 13 were injured and the total loss to property was about \$16,000.

#### SEVERE STORMS IN WESTERN TENNESSEE.

By S. C. EMERY, Local Forecaster.

During the afternoon of March 13, 1913, several violent and destructive storms occurred in northern Mississippi and western Tennessee. The regions affected in Tennessee were the counties lying immediately west of the Tennessee River and extending from the northern line of Mississippi to the counties bordering on Kentucky, comprising in all about seven counties. These storms are reported to have moved in a northeasterly direction, attended by heavy rain and an unusual amount of lightning. The path of destruction ranged from a quarter to a half mile in width. Several correspondents report a funnel-shaped cloud traveling at a rapid rate with a bounding motion, striking the earth and rising again, and again descending. At times it appeared to merge into the clouds which were low and threatening.

These storms occurred in connection with the passage of a low-pressure area of unusual energy, the center of which moved from Amarillo, Tex., at 7 a. m. (March 13) to central Iowa, at 7 p. m., where the pressure at that hour was 29.24 inches. At the time the Tennessee storms were in progress, the center of the barometric depression was probably over Kansas, and heavy rains were falling in Louisiana, Mississippi, Alabama, Georgia, and portions of Tennessee. To the south and east of the center of disturbance the temperature ranged from 60° to 70°, while in South Dakota and western Nebraska had fallen to 20° to 30° and was snowing heavily.

The most destructive storm of the series and which without doubt was a tornado, probably originated in Lafayette County, Miss., near the town of Oxford from which place it moved northeastward and passed about 2 miles west of Hickory Flat, Miss., at 12.30 p. m., where 12 houses were destroyed and one person killed and much farm property damaged or destroyed. The storm next appeared at the southwestern corner of Hardeman County, Tenn., near Middletown, where 5 persons were killed and at least 20 buildings destroyed. From Middletown the storm passed on through the northern portion of McNairy County, destroying 10 buildings near Finger and McNairy in that county, but no fatalities are reported. It passed about 7 miles to the east of Henderson, Chester County, Tenn., causing the death of 3 persons and blowing down some farm buildings, fences, etc., along its path, reaching Lexington, Tenn., at 2.15 p. m. At this place 100 or more buildings were destroyed, 57 being residences, some of which were the most substantial in the city, while shade trees that had ornamented the town for generations were strewn in all directions. As far as known, only 3 persons were killed at this place. From Lexington the storm continued its northeasterly course through the southeast corner of Carroll County, striking the town of Cavvia, where several buildings were destroyed. At Cavvia the storm cloud is reported to have been funnel-shaped and very destructive wherever it came in contact with the earth. The next town in the path of the storm was Camden, Benton County, Tenn., where about 40 buildings were destroyed, one man lost his life, and several persons were seriously injured.